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Nevada Governor Brian Sandoval  
State Capitol Building  
101 N. Carson St.  
Carson City, NV 89701

April 3, 2016

Dear Governor Brian Sandoval,

Concerned parents in your state have asked me to comment in regards to the health risks of wireless radiofrequency radiation exposure in Nevada classrooms.

I was Founding Director of the Board on Environmental Studies and Toxicology of the U.S. National Research Council, and Founding Director of the Center for Environmental Oncology at the University of Pittsburgh Cancer Institute. President Clinton appointed me to the Chemical Safety and Hazard Investigation Board, and I am former Senior Advisor to the Assistant Secretary for Health in the Department of Health and Human Services. I founded the non-profit Environmental Health Trust in 2007 to provide basic research and education about environmental health hazards. Our scientific team is currently focusing on the health risks of radiofrequency radiation as an important public health issue.

Many people are unaware that cell phones and wireless laptops and tablets function as two-way microwave radios. A typical classroom might have the following scenario: every student has a laptop--which is typically tested for use 8 inches from an adult male body--a cell phone in the pocket--which is also tested at a minimum distance from an adult male body-- and a network transmitter on the ceiling and possibly a cell tower outside next to the sports field. All these devices emit microwave radiation which can be readily absorbed into children's bodies and brains.

Manufacturers specifically recommend that cell phones be used "as tested"—at this little-known minimum distance from the body. Recently, [\*Consumer Reports\*](#) in November advised that people should not keep phones in the pocket—advice that few children or adults appreciate. *These devices have never been tested for safety with children.* Accumulating research indicates that long-term exposure to low levels over long lifetimes could pose a serious risk to our health.

Regarding tested distances for using laptops, the Federal Communications Commission (FCC) states that laptops and computers are "mobile devices are transmitters designed to be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons." The body in this instance refers to a large male weighing more than 200 pounds and standing six feet tall.

As the county may be preparing to increase student use of computer laptops, please be aware that the Samsung [Chromebook manual](#) states:

“United States of America USA and Canada Safety Requirements and Notices

- Do not touch or move antenna while the unit is transmitting or receiving.
- Do not hold any component containing the radio such that the antenna is very close or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Regardless of the power levels, care should be taken to minimize human contact during normal operation.
- FCC Statement for Wireless LAN use: *“While installing and operating this transmitter and antenna combination the radio frequency exposure limit of 1mW/cm<sup>2</sup> may be exceeded at distances close to the antenna installed. Therefore, the user must maintain a minimum distance of 20cm from the antenna at all times.”*

As one of the leaders in this nation, your state has an opportunity to set an example for school districts nationwide by installing safer technology in classrooms and educating students, teachers and staff about tested distances that devices should be used to reduce radiation. A number of public and private schools have already implemented such policies. Just as we provide children with seat belts and bike helmets, a precautionary approach to wireless is recommended by many scientists and governments worldwide.

For more information about all of these issues, please read cell phone instructions for various models at <http://showthefineprint.org>. Our [newly posted Ebook](#) also details fine print safety instructions in wireless device user manuals.

When children use these devices close to their bodies, they are exceeding these safety instructions, and exposing themselves to radiofrequency (RF) radiation levels which can exceed our government FCC RF radiation exposure limits. The FCC RF exposure limit was designed to protect the public from the thermal (heating) effects of acute exposure to RF energy. The FCC states, “Tissue damage in humans could occur during exposure to high RF levels because of the body's inability to cope with or dissipate the excessive heat that could be generated. Two areas of the body, the eyes and the testes, are particularly vulnerable to RF heating because of the relative lack of available blood flow to dissipate the excess heat load.”

#### CHILDREN ABSORB MORE RADIATION THAN ADULTS

Our recently published research in the [IEEE Spectrum](#) with investigators at the Federal Universities of Brazil provides new state-of-the-art radiation exposure brain modeling which confirms that substantially higher radiofrequency radiation doses occur in younger children as compared to adults even where products comply with tested guidelines developed for adults.

#### FCC REGULATIONS ARE OUTDATED

FCC exposure limits were set more than 19 years ago and were based on decades-old research. The Government Accountability Office published a [2012 Report](#) that calls on the FCC to formally reassess their current RF energy (microwave) exposure limits, stating that the “FCC RF energy exposure limit *may not* reflect the latest research.” I encourage you to read scientific submissions to FCC Proceeding Number

13-84 at <http://bit.ly/1aGxQiq>. It is unknown when the FCC will make a ruling, however, *until that time* the current outdated FCC limits are *not reflective* of the current state of science.

#### FCC REGULATIONS DO NOT PROTECT THE PUBLIC FROM BIOLOGICAL EFFECTS

As the California Medical Association states in their [2014 Resolution](#) calling for updated FCC Regulations, “peer reviewed research has demonstrated adverse biological effects of wireless EMF [electromagnetic fields] including single and double stranded DNA breaks, creation of reactive oxygen species, immune dysfunction, cognitive processing effects, stress protein synthesis in the brain, altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and brain tumors.”

In May 2015, over 200 scientists who have authored more than 2,000 articles on this topic appealed to the United Nations to address “the emerging public health crisis” related to cellphones and other wireless devices, urging that the United Nations Environmental Programme (UNEP) initiate an assessment of alternatives to current exposure standards and practices that could substantially lower human exposures to non-ionizing radiation. These scientists state that “the ICNIRP guidelines do not cover long-term exposure and low-intensity effects, “ and are “ insufficient to protect public health.” They also state that “the various agencies setting safety standards have failed to impose sufficient guidelines to protect the general public, particularly children who are more vulnerable to the effects of EMF.” Please see their website at <https://emfscientist.org>.

#### INCREASED CANCER RISK

Wireless radiofrequency radiation was classified as a Class 2B “Possible Human Carcinogen” by the World Health Organization’s International Agency for Research on Cancer in 2011. According to many scientists, evidence *has increased* since 2011, indicating that cell phone and wireless radiation should be classified as a “probable carcinogen.” Those exposed at younger ages show four to eight times increased cancer risk. [Replicated research](#) just published in Biochemical and Biophysical Research Communications indicates that radiofrequency acts as a *tumor promoter* at low to moderate levels. Two leading researchers **Frank Barnes** and **Ben Greenebaum** have just published theoretical arguments to explain how low-level RF radiation- without violating the laws of physics or chemistry- can alter the growth rates of cancer cells in their [IEEE Power Electronics article](#).

#### CONCERN FOR PREGNANT STUDENTS AND STAFF

Pregnant students and staff are especially at risk from wireless because the fetus is the most vulnerable to toxic exposures. Several experimental studies are showing irreversible changes after prenatal exposure to cell phone and wireless radiation such as altered brain functioning, decreased brain cells and altered reproductive organ development. More than 100 physicians, scientists and public health professionals joined together to express their concern about the risk that wireless radiation poses to pregnancy and now *urge pregnant women to limit their exposures*. Please read these scientists’ [BabySafe Joint Statement](#). Please watch Dr. Hugh Taylor, Chief of Obstetrics at Yale Medicine discuss his research findings indicating prenatal exposure could damage fetal brain development at [the Babysafe Press Conference in June 2014](#).

## SIMPLE STEPS WILL PROTECT CHILDREN

Compelling research raises the possibility of very serious harm to children from radiofrequency radiation exposures well below “FCC compliant” levels. Legal does not mean safe. Based on the preliminary work that I share with you here, I urge you to forgo the use of such devices such as virtual reality cardboard as there is no research that has considered their impact on children’s eyes. At this time, the smart choice for school decision makers is to act now and reduce radiofrequency wireless exposures. In fact, many countries (over 20) and health authorities worldwide recommend reducing radiofrequency radiation to children. More recently, the Cyprus Government’s National Committee on Environment and Children’s Health released a [video about reducing wireless](#) and I invite you to watch this excellent example of responsible action at this link <https://www.youtube.com/watch?v=H43IKNjTvRM>.

In a Bring Your Own Device policy, cell phones are not only allowed *in* the classroom but are actively used in the curriculum. If a policy allowing cell phones into classrooms is implemented, then information should be routinely provided to all students using a wireless device at school about the fine print advisories and *how to reduce radiation exposures*. For example, if phones are used on airplane mode, and wireless is turned off on computers then these devices will neither send nor receive microwave radiation. A cell phone on airplane mode can still be used for various applications such as a calculator or camera and yet will not have radio-frequency emissions.

When powered on, phones undergo short bursts of microwave radiation up to 900 times per minute, *whether or not the phone is being used for talking*. Once teachers and students are educated on how they can simply turn their phone onto airplane mode, then they can use the phone in the classroom *without* being exposed to unnecessary radiofrequency radiation.

Likewise, laptops such as Chromebooks are also emitting constant radiation and at much higher levels when a student is streaming video or using cloud based applications. Laptops can easily be hardwired to ethernet so that students can safely use the internet without radiation emissions. Please review the [Best Practices for Low EMF in Schools developed by the Northeast Collaborative For High Performing Schools](#) which details how schools can reduce exposure to radiofrequency fields and still have full internet connectivity.

Along with [the recommendation](#) of over 200 scientists (see <https://emfscientist.org>) and health authorities worldwide, I recommend that the best course of action is to take simple precautions—as many nations already currently advise. *Children’s exposures to wireless radiation should be reduced as much as possible*. We have a responsibility to act now to reduce children’s exposure to radiofrequency radiation. Children’s nervous, immune and reproductive systems are rapidly developing and, along with pregnant women, children deserve an abundance of caution.

As several colleagues and I wrote in [a letter](#) to the U.S. Secretary of Education just a few months ago, we recommend school districts do the following:

1. **Raise school community awareness through new educational curriculum:** Students, teachers and their families should be given information on wireless health risks and simple precautionary

steps they can take to protect their health. It is important to teach children how to use technology both safely and more responsibly in order to protect their health and wellbeing.

2. **Install a safe communication and information technology infrastructure in schools to meet educational needs:** Solutions exist to reduce exposures to wireless emissions and mitigate the health risk. Low-EMF Best Practices have been developed, allowing educational needs to be met with safer, hard-wired Internet connections, which are also faster and more secure.

Low-EMF Best Practices are the solution that allows for full communication, information access and learning tools use in the classroom while minimizing unnecessary health risks. Your state can thoughtfully integrate safe technology into every classroom while responsibly safeguarding the health of every generation.

I fully understand that this information has not been widely understood. I would be happy to provide or develop an online technical briefing to your senior staff to assist you as you make decisions today that will affect the health of students for the rest of their lives.

Yours respectfully,



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[Letter to US Secretary of Health on Technology](#)  
[Briefing on International Policy Efforts in Regards To Children In School](#)  
[Briefing For Schools on Wireless Radiation and Children's Health](#)  
[Research on Health Effects of Cell phones and Wireless](#)  
[Collaborative For High Performing Schools : Low EMF Best Practices](#)  
[Dr. Joel Moskowitz, Director Center for Family and Community Health, University of California at Berkeley Documentation on Wi-Fi in School and Children's Health](#)  
[WiFi In Schools: Are We Playing It Safe With Our Kids? ,The Santa Clara County Medical Association Bulletin March/April 2015](#)